CLAIMS

1. A growth method of nitride semiconductor layer comprising:

a first step for growing a first nitride semiconductor layer on an $Al_xGa_yIn_{1-x-y}N$ ($0 < x < 1, 0 < y < 1, 0 < x+y < 1$) layer;

a second step for reducing the thickness of the first nitride semiconductor layer by growth interruption; and,

a third step for growing a second nitride semiconductor layer having a band gap energy higher than that of the first nitride semiconductor layer on the first nitride semiconductor layer with the reduced thickness.

2. The growth method of nitride semiconductor layer in claim 1, wherein at the first step, an In source and a nitrogen source is used for growing the first nitride semiconductor layer.

3. The growth method of nitride semiconductor layer in claim 2, wherein an Ga source is further used for the first nitride semiconductor layer and the amount of the Ga source is very small as compared to the amount of the In source.

4. The growth method of nitride semiconductor layer in claim 3, wherein at the second step, the growth interruption is performed by supplying the nitrogen source with the supply of the In source intercepted.

5. The growth method of nitride semiconductor layer in claim 2, wherein at the second step, the growth interruption is performed by supplying the nitrogen source with the supply of the In source intercepted.

6. The growth method of nitride semiconductor layer in claim 1, wherein at the second step, the reduced first nitride semiconductor layer has a quantum well structure.

7. The growth method of nitride semiconductor layer in claim 1, wherein at the first step, the first nitride semiconductor layer is grown at a temperature of 700℃ to 800℃.

8. The growth method of nitride semiconductor layer in claim 1, wherein the temperature of the first nitride semiconductor during the growth and the growth interruption is maintained.

9. The growth method of nitride semiconductor layer in claim 1, wherein at the second step, the growth interruption time is equal to or less than 60 seconds.

10. The growth method of nitride semiconductor layer in claim 1, wherein the second nitride semiconductor layer is grown at a temperature equal to or higher than that of the first nitride semiconductor layer.

11. A nitride semiconductor light emitting device comprising:

a substrate;

at least one nitride semiconductor layer grown on the substrate and including an top layer of $Al_xGa_yIn_{1-x-y}N$ ($0 \leq x \leq 1$, $0<y \leq 1$, $0<x+y< 1$);

a quantum well layer grown on the top layer of $Al_xGa_yIn_{1-x-y}N$ ($0<x< 1$, $0<y< 1$, $0<x+y< 1$); and,

an additional nitride semiconductor layer grown on the quantum well layer and having a band gap energy higher than that of the quantum well layer;

wherein the quantum well layer comprises an In-rich region, a first compositional grading region with In content increasing between the top layer of $Al_xGa_yIn_{1-x-y}N$ ($0 \leq x \leq 1$, $0<y \leq 1$, $0<x+y \leq 1$) and the In-rich region, and a second compositional grading region with In content decreasing between the In-rich region and the additional nitride semiconductor layer.

12. The nitride semiconductor light emitting device in claim 11, wherein the quantum well layer is formed of $In_xGa_{1-x}N$ and x in the In-rich region of the quantum well layer is equal to or more than 0.6.

13. The nitride semiconductor light emitting device in claim 11, wherein the quantum well layer is grown using an In source and a nitrogen source, and the thickness of the quantum well is reduced by growth interruption which is performed by supplying the nitrogen source with the supply of the In source

intercepted.

14. The nitride semiconductor light emitting device in claim 11, wherein the quantum well layer is formed of $In_xGai_{-x}N$ and x in the In-rich region of the quantum well layer is within a range of 0.5 to 0.8.

15. The nitride semiconductor light emitting device in claim 11, wherein the thickness of the quantum well is equal to or less than 2nm.

16. The nitride semiconductor light emitting device in claim 15, wherein the quantum well layer is formed of $In_xGai_{-x}N$ and x in the In-rich region of the quantum well layer is equal to or more than 0.2.

17. The nitride semiconductor light emitting device in claim 11, wherein the additional nitride semiconductor is formed of $Al_yGai_{-y}N$ ($0 \leq y \leq 1$).

18. The nitride semiconductor light emitting device in claim 11, further comprising at least one barrier layer of $Al_yGai_{-y}N$ ($0 \leq y \leq 1$) adjacent to the quantum well layer and having a band gap energy higher than that of the additional nitride semiconductor layer.

19. The nitride semiconductor light emitting device in claim 18, wherein

the at least one barrier layer of Al_yGai-_yN ($0\leq y\leq 1$) has a thickness equal to or less than 5nm.

20. The nitride semiconductor light emitting device in claim 18, wherein the quantum well layer and the at least barrier layer of $Al_yGa1\text{-}yN$ ($0\leq y\leq 1$) are alternately laminated to form a multi-quantum well structure.

21. The nitride semiconductor light emitting device in claim 20, wherein the pairs of the quantum well and the at least barrier layer of $Al_yGa1\text{-}yN$ ($0\leq y\leq 1$) are equal to or less than 100 pairs.

22. The nitride semiconductor light emitting device in claim 11, wherein the top layer of $Al_xGa_yIni\text{-}\chi_yN$ ($0<x< 1$, $0<y< 1$, $0<x+y< 1$) is GaN.

23. The nitride semiconductor light emitting device in claim 12, x in the In-rich region of the quantum well layer is equal to or less than 0.7.